



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,798	07/30/2003	Pradeep K. Govil	1857.1860000	9413
26111	7590	10/19/2006	EXAMINER	
STERNE, KESSLER, GOLDSTEIN & FOX PLLC 1100 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			PHAN, JAMES	
			ART UNIT	PAPER NUMBER
			2872	

DATE MAILED: 10/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/629,798	GOVIL ET AL.	
	Examiner	Art Unit	
	James Phan	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-7,9-17,19-22,26,28 and 29 is/are pending in the application.
- 4a) Of the above claim(s) 13 and 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2,4-7,9,12,14-17, 19-20,22,26,28-29 is/are rejected.
- 7) ☒ Claim(s) 10 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

In responding to the rejection of claims 1, 2, 4-7, 12, 14-17, 19, 20 and 22 under 35 U.S.C. 102 (a) applicant states that claims 1 and 16 have been amended to include subject matter similar to the allowable subject matter found in now cancelled claims 3 and 27; thus, the rejection of claims 1 and 16 should be withdrawn; that claims 2, 4-7, 12, 14-15, 17, 19, 20, 22 and 29 should be allowed because they are dependent on the allowed claims 1 and 16; and that claims 13 and 21 should be rejoined and allowed because they are dependent on respective allowed, generic, linking claims 1 and 16. Applicant's arguments have been fully considered but they are not persuasive because claims 1 and 16 are broadened and do not include all of the limitations of claims 3 and 27, respectively.

Claim Rejections - 35 USC § 112

New claim 29 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 29 recites "wherein the electrodes are coupled to a measuring system that is configured to generate a voltage value corresponding to a measured wavefront aberration, the voltage value being used by the electrodes to control movement of the extensions." The recitation is not consistent with the teaching in the specification and contains new matters because the electrodes are

not coupled to a measuring system, and the measuring system does not generate a voltage value corresponding to a measured wavefront aberration. See specification, page 5, paragraph 0021, and Fig. 1.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-2, 12, 14-17, 20, 22 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Jensen.

In regard to claims 1, 2, 12, 16-17 and 20, Jensen discloses a deformable optical system (1) comprising a reflection device (mirror 2) having a first reflecting surface and a second (back) surface; a piezoelectric actuator having a piezoelectric chuck (4) and movable extensions including piezoelectric pins (3), each of the extensions being coupled at a first end to a surface of the piezoelectric chuck (4) and at a second end to the second surface of the reflection device; electrodes (3') individually coupled to corresponding ones of the extensions; and controller (column 5, lines 35-60) coupled to the electrodes to control movement of the extensions via the electrodes. See Figs. 1A-5 and the accompanying text.

In regard to claim 14, the claimed feature is inherently disclosed because the tilting of the reflection device (mirror 2) is dependent on the bending of the extensions.

In regard to claims 15 and 22, see column 4, lines 53-54.

In regard to claim 26, the number of extensions is 1 per square millimeter because $1.6 \text{ mm} \times .6 \text{ mm} = .96 \text{ square millimeter}$ (see column 4, lines 53-54) which is close to 1 square millimeter.

Claims 1, 2, 4-7, 9, 12, 14-17, 19, 20, 22 and 28-29 are rejected under 35 U.S.C. 102(a) as being anticipated by Van Dijsseldonk et al.

In regard to claims 1, 2, 5-7, 16-17, and 28, Van Dijsseldonk et al discloses a deformable mirror (30) comprising a reflection device (33) having a first reflecting surface and a second (back) surface; a piezoelectric actuator having a piezoelectric chuck (11) and movable extensions including piezoelectric pins (31,32), each of the extensions being coupled at a first end to a surface of the piezoelectric chuck (4) and at a second end to the second surface of the reflection device; electrodes individually coupled to corresponding ones of the extensions (page 6, paragraph 0065, lines 5-9); and a control system includes a controller (26) coupled to the electrodes to control movement of the extensions via the electrodes. The control system further includes a measuring system (22-24) that measures a wavefront aberration/error (page 5, paragraphs 0054 and 0056). See Figs. 4 - 6 and the accompanying text.

In regard to claims 4 and 19, the recited feature inherently disclosed for conducting control signals from the controller (26).

In re claim 9, the claimed feature is inherently disclosed because the applied prior art discloses a control system for correcting wavefront error in the mirror (30), and the use of Zernike polynomials to mathematically describe the aberrations in an optical system such as lens, mirror, etc., is conventional.

In regard to claims 12 and 20, since the radius of the reflective device is very large, the reflective device is considered substantially flat.

In regard to claim 14, see Fig. 6.

In regard to claims 15 and 22, the claimed dimension of the extensions is inherently disclosed because there is no boundary of the claimed range.

In regard to claim 29, Van Dijsseldonk et al discloses controller (26) receives measured wavefront aberration/error from the measuring system (22-24) and generates drive signals for the actuators of the adaptive optics (100), i.e. deformable mirror, to minimize the wavefront error (page 5, paragraph 0054, last 10 lines). Thus, the drive signals are inherently voltage values because they are used by the electrodes of the actuators to control movement of the extensions so as to minimize the wavefront error. Note that claim 29 has been interpreted in light of the applicant's specification.

Allowable Subject Matter

Claims 10-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: none of the cited references teaches or suggests a deformable optical device having the combined features defined in 10. Claim 11 is dependent on claim 10 and thus allowable at least for the same reason.

Conclusion


Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Phan whose telephone number is (571) 272-2317. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



James Phan
Primary Examiner
Art Unit 2872

JP

Oct. 2006